



Study the Effects of Nevada Solar One Installation on Land Surface Temperature

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Due to depleting fossil fuels, many energy purveyors are adding renewable resources – such as geothermal, wind, and solar energy – to their energy portfolios. In the United States, the southwestern region has great potential to collect solar energy and Nevada has been engaging to harness sun's energy on a large scale. In this process, there can be various environmental implications due to changes in the land cover that could potentially be negative depending on the size, type, and location of a solar installation. In particular, Utility Scale Solar Energy (USSE) plants can result in fragmentation of the countryside with potential loss of the identity elements typical of the region (e.g., cultivability and biodiversity). These problems must be understood and handled with care.

This study assesses the effects of a USSE plant (Nevada Solar One) in the southwestern US on land surface temperature (LST). The changes in LST are analyzed for pre- and post-installation periods using remote sensing data. The study is conducted for 2002 to 2011 period considering January and July months for winter- and summer-time behaviors, respectively. A time series of Brightness Temperature data from Landsat 5 Thematic Mapper (TM) using thermal infrared (Band 6) observations were obtained from USGS CDRs. The results show that Nevada Solar One construction has decreased the land surface temperature inside the plant area whereas it did not alter significantly the surrounding temperature. Nevada Solar One plant uses photovoltaic (PV) and concentrating solar power (CSP) technologies for energy production. The remote sensing data reveals that the CSP covered surface area has lower surface temperature compared to PV covered area. In the end, the variations in temperature were compared to the land cover changes from previous work to understand the relationship between them due to USSE construction.



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